MEMORANDUM

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From: Lydia Huang, BASELINE

Subject: Pre-Design Investigation Memorandum
VOCs in Groundwater Near Building 99 RAP Site
Former Oakland Army Base - EDC Area
Oakland, California

This memorandum has been prepared by BASELINE Environmental Consulting, on behalf of the Port of Oakland ("Port"), and presents a summary of chlorinated volatile organic compounds ("VOCs") of concern identified in the shallow groundwater near Building 99 (Figure 1). The *Final Remedial Action Plan* ("RAP") for the Oakland Army Base (EKI, 2002) designated the VOCs in Groundwater Near Building 99 a RAP site because of the concern that VOCs in the groundwater may pose a potential health risk to commercial workers from inhalation of indoor air. According to the RAP, "[e]ffective remediation of RAP sites is not anticipated to be cost-effectively implemented as part of redevelopment and will be started prior to redevelopment to prevent conflicts with land uses. Residual contamination found at these locations may not be sufficiently characterized or may not be adequately remediated as part of activities performed during or after redevelopment" (EKI, 2002). This memorandum also presents a focused pre-design investigation work plan to collect additional chlorinated VOC groundwater data to augment existing Army data. A separate draft pre-design investigation memorandum addressing the Building 99 (Soil) RAP site was submitted to the Department of Toxic Substances Control ("DTSC") on 6 December 2004.

The RAP identified vinyl chloride and cis-1,2-dichloroethene as the predominant VOCs of concern. Other VOCs (e.g., benzene, toluene, ethylbenzene, and xylenes ("BTEX"), trimethylbenzenes) may be associated with two underground storage tank ("UST") sites, Tanks B and C and Tank Q, located immediately west of Building 99. The presence of these compounds in soil and groundwater will be addressed in a Case Closure Summary Document that is proposed to be prepared for these two UST sites in February 2005, as required by the Tentative Site Cleanup Requirements to be adopted by the Regional Water Quality Control Board. These compounds, associated with the UST sites, are not considered in this memorandum.

The Army collected grab groundwater samples from 61 soil borings or hydropunches and 41 samples from 12 monitoring wells in the vicinity of Building 99, which were analyzed for chlorinated VOCs.[1] The samples were collected between 1997 and 2003. Sampling of the groundwater monitoring wells near Building 99 has been performed sporadically by the Army and many samples were only analyzed for BTEX and not chlorinated VOCs. None of the available data collected by the Army have exceeded the Remediation Goals ("RG") for chlorinated VOCs in groundwater established in the RAP, which were established to be protective of the inhalation pathway for indoor commercial workers. However, the sampling conducted by the Army has not thoroughly investigated the presence of chlorinated VOCs in the shallow groundwater.

The VOCs in Groundwater Near Building 99 RAP site is on property owned by both the Port and the Oakland Base Reuse Authority ("OBRA"), the boundary being a northwest-southeast diagonal line that cuts through the northeastern corner of Building 99 (Figure 2). OBRA transferred the area south of the boundary line around Building 99 of the former Oakland Army Base to the Port in August 2003. According to the Memorandum of Understanding between the Port and OBRA, the Port will conduct investigation and remediation activities on Port property and OBRA will perform work on OBRA property. However, the Port or OBRA are currently negotiating a Right-of-Entry ("ROE") agreement which would allow the Port's consultant to perform work on OBRA property in the Building 99 area. In the event that the ROE is not executed in time for field work, the Port and OBRA will coordinate activities proposed in this memorandum, but each party will direct its own consultant/contractor to perform the work. The Port and OBRA agreed that the Port will coordinate and have overall responsibility for investigation and remediation of the VOCs in Groundwater Near Building 99 RAP site in accordance with the requirements of the RAP.

1. HISTORICAL USE OF BUILDING 99

Building 99 was originally built around 1918 by Union Construction Company, a ship building company. Subsequently, portions of the building have been used for "structural iron & pipe works," black smith/machine shop with furnace, and metal plate rolling by the Pacific Coast Engineering Company. After the Army occupied the building starting about 1941, the primary activities in and around the building appear to have been vehicle and electrical maintenance. The Army installed and operated three USTs on the west side of Building 99 which were removed in 1990. In addition, the Army operated a washrack outside the southeastern corner of the building for washing vehicles which was connected to an oily-water separator discharging into the sanitary sewer (IT, 2000).

Historic uses in and around the building have released contaminants into the subsurface. Documented potential sources of chlorinated VOCs in and around the building include:

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[1] For the purpose of facilitating data retrieval from the chemical database, the term 'vicinity of Building 99' is equivalent to the former Army designation 'BRAC Parcel 10'.

- discharge of waste oil and solvents into the storm drain system ("RMP" location[2]);
- paint shop and storage located north of the building ("RMP" location);
- washrack and oily-water separator ("RMP" location); and
- grease pit in the northern portion of the building used for vehicle maintenance (first located in August 2004).[3]

The Army's Environmental Baseline Survey of the former Oakland Army Base contains an account of a personal interview that suggests a source of VOCs could have been a solvent washrack used to degrease equipment (location unknown) or solvents used in the metal plating shop in Building 99 (Foster Wheeler, 1996). The Army may have discharged industrial wastewater, including solvents, into the storm drain system (Chemical Systems Laboratory, 1982).

2. SITE HYDROGEOLOGY

The site was originally tidal marshland and was filled in the early 1900s. Natural ground surface prior to filling sloped to the Bay toward the west and northwest. Fill in the vicinity of Building 99 is generally between ten and 15 feet thick. In general, the fill is mostly mixtures of sands; some gravel is interspersed in the shallower fill. The deeper fill is often described as being gray in color and contains shell fragments, indicative of hydraulically-placed sand fill. Native Young Bay Mud underlies the fill and acts as an aquitard.

Shallow groundwater in the fill in the vicinity of Building 99 is generally encountered about five feet below the ground surface. Groundwater is expected to flow toward the west and northwest, reflective of the slope of the natural ground surface prior to filling (Kleinfelder, 1998). Water levels in wells on the west side of Building 99 have direct responses to tidal fluctuations in the Bay, which is about 600 feet to the west. The water level in a storm drain manhole on the west side of Building 99 also responds directly to the tide. Groundwater level response to tidal effects may be complicated by leakage from the storm drain system (Kleinfelder, 1998).

The only instances of on-going groundwater monitoring that the Army has conducted is related to two underground storage tank ("UST") sites on the west side of Building 99. The Army has been monitoring three wells at each of the two UST tanks sites (Tanks B and C, and Tank Q). At the Tank Q UST site, three wells inside Building 99, wells ICFMW203, ICFMW204, ICFMW205, were monitored in March and July 2003; the groundwater flow direction during both events was

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[2] RMP locations are identified in Appendix E of the RAP (Risk Management Plan) as those locations where minor releases of petroleum and other constituents may have occurred (EKI, 2002).

[3] Possible soil contamination associated with the pit will be investigated as part of the pre-design investigation for the Building 99 (Soil) RAP Site.

toward the northeast. At the Tanks B and C UST site, wells SMW-42, ICFMW207, and ICFMW214 were also monitored in March and July 2003; the groundwater flow direction was toward the southwest for both events. The two sets of wells are located within 300 feet of each other and the fill materials are similar. The reason for the major difference in flow directions is unknown.

3. SUMMARY OF AVAILABLE CHLORINATED VOC DATA IN GROUNDWATER

A summary of chlorinated VOC analytical results for all groundwater samples collected by the Army from the vicinity of Building 99 is presented in Table 1.[4] The maximum vinyl chloride and cis-1,2-dichloroethene concentrations at each sample location previously sampled by the Army are shown on Figures 2 and 3, respectively. For the soil boring locations, the values indicated in the figures represent the concentrations found in the grab groundwater sample collected at the time of drilling. For the monitoring well locations, the values in the figures represent the maximum concentration identified during all the sampling events that have occurred at each well. If all results for a given well were "ND," then the highest laboratory reporting limit is indicated in the figures; if even one result for a given well was quantified by the laboratory, including estimated values, then the highest quantified value is indicated even if another result was reported as "ND" with a higher laboratory reporting limit.

The source(s) of chlorinated VOCs in groundwater is unknown. Available soil quality data suggest that shallow soil is not a likely source. All the locations where soil samples were collected by the Army and analyzed for chlorinated VOCs are shown in Figure 4. Other than methylene chloride, which is a common laboratory contaminant, soil samples from only seven out of the over 50 locations were reported to contain concentrations of chlorinated VOCs above the laboratory method detection limits. One sample was collected as a confirmation sample from the oily water separator OWS-4 excavation outside the southeastern corner of Building 99 (10S37); one location was under the northern end of Building 99 (ICF10S11); one location was under Building 85 (IT10S101); one location was west of Building 99, south of Tank Q (ICF10S35); and three

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[4] Only chlorinated VOCs with RGs established for groundwater in the RAP are summarized in Table 1 and addressed in this memorandum. Based on Table 5-5 of the RAP (Chemicals of Concern in Groundwater Outside Former ORP/Building 1 Area), numerous chlorinated VOCs identified using EPA Methods 8010 and/or 8260 are not considered chemicals-of-concern for groundwater in the Building 99 area. According to Section 5.2.2 of the RAP, these compounds were excluded because they were infrequently detected, below risk-based screening levels, and RGs were not set in the RAP. Therefore, the following compounds are not addressed in this memorandum: 1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1-dichloropropene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dibromo-3-chloropropane, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,3-dichloropropane, 1,4-dichlorobenzene, 2,2-dichloropropane, 2-chloroethyl vinyl ether, 2-chlorotoluene, 4-chlorotoluene, bromochloromethane, chlorobenzene, chloroethane, chloromethane, cis-1,3-dichloropropene, dichlorodifluoromethane, trans-1,3-dichloropropene, and trichlorotrifluoroethane.

locations were located about 400 feet north of Building 99, adjacent to Bataan Avenue (ERM-SB-24, ERM-SB-25, and ICF10S7) (Figure 4). The concentrations of chlorinated VOCs identified at these locations were:

- 1,1,1-Trichloroethane
  ICF10S11 from 1 foot below the ground surface ("bgs") at 0.0023 mg/kg - *estimated value*
- Chloroform
  ICF10S11 from 1 foot bgs at 0.0018 mg/kg - *estimated value*
  ICF10S35 from 2.5 feet bgs at 0.00092 mg/kg - *estimated value*
- Tetrachloroethene
  10S37 from 3.75 feet bgs at 0.0025 mg/kg - *estimated value*
  ICF10S7 from 4.25 feet bgs at 0.0016 mg/kg - *estimated value*
  ICF10S11 from 1 foot bgs at 0.0014 mg/kg - *estimated value*
  ERM-SB-24 from 5 feet bgs at 0.00053 mg/kg
  ERM-SB-24 from 8 feet bgs at 0.00053 mg/kg
  ERM-SB-24 from 11 feet bgs at 0.0012 mg/kg
  ERM-SB-24 from 15 feet bgs at 0.0012 mg/kg
  ERM-SB-25 from 2 feet bgs at 0.00051 mg/kg
  ERM-SB-25 from 11 feet bgs at 0.0011 mg/kg
- Trichloroethene
  10S37 from 3.75 feet bgs at 0.0025 mg/kg - *estimated value*
- Trichlorofluoromethane
  IT10S101 from 0.5 foot bgs at 0.019 mg/kg - *estimated value*

3.1 Vinyl Chloride

A total of 61 grab groundwater samples from soil borings or hydropunches and 41 samples from 12 groundwater monitoring wells in the vicinity of Building 99 were collected by the Army and analyzed for vinyl chloride. The locations where vinyl chloride were detected above laboratory reporting limits are generally limited to the central portion of Building 99, and northeast and east of Building 99 (Figure 2). The highest concentrations were found on the east side of Building 99 and underneath the central portion of the building.

The highest vinyl chloride concentration identified among all the groundwater samples collected by the Army was in a grab sample from boring 10S49, located about 20 feet northeast of the northeastern corner of Building 99, at 29 µg/L; the highest concentration is below the groundwater RG of 32 µg/L. Other locations where vinyl chloride was found at concentrations greater than 10 µg/L were 10S42, 10S44, 10S50, 10S55, 10S56, 10S68, IT10S102, and SMW-86 (Figure 2). It should be noted that soil samples were not collected from many of the locations where vinyl chloride was identified in the grab groundwater samples, including locations with the highest reported vinyl chloride concentrations.

Many of the existing wells were installed by the Army to investigate groundwater impacts associated with the UST sites located on the west side of Building 99. Only some of the existing wells are at locations useful to investigate the presence of vinyl chloride in the groundwater. Only one well, SMW-86, is located in the area where the highest concentrations were identified in grab groundwater samples. The maximum concentration identified in samples from SMW-86 was 24.5 µg/L from the April 1999 sampling event. This well has been sampled on seven occasions between October 1998 and April 2000, and the vinyl chloride concentrations in the samples have ranged from 14.4 to 24.5 µg/L; the vinyl chloride concentration reported for the most recent sample collected in April 2000 was 18.1 µg/L (Table 1).

Vinyl chloride is known to be a degradation product of other chlorinated compounds, including tetrachloroethene and 1,2-dichloroethene. Vinyl chloride has not been identified above laboratory reporting limits in any soil samples, and potential parent compounds have been identified in soil samples from a few locations and only at very low concentrations (see discussion in Section 3, above).

3.2 Cis-1,2-Dichloroethene

Samples of the shallow groundwater have been collected and analyzed for cis-1,2-dichloroethene from 73 locations in the vicinity of Building 99 (same as vinyl chloride locations). The maximum concentration of cis-1,2-dichloroethene identified in a grab groundwater sample collected from boring 10S67in the Building 99 area was 41.1 µg/L, located about 250 feet east of Building 99 (Figure 3 and Table 1). The RG for cis-1,2-dichloroethene is 180,000 µg/L. In addition, about 75 soil samples have been collected from about 55 locations in the vicinity of Building 99 and analyzed for cis-1,2-dichloroethene. None of these samples contained the compound above laboratory reporting limits. It does not appear that cis-1,2-dichloroethene is a VOC of concern in the shallow groundwater near Building 99.

4. OBJECTIVES OF PROPOSED SAMPLING

The purpose of this proposed focused investigation is to determine whether chlorinated VOC concentrations in the groundwater near Building 99 exceed the RGs established in the RAP. As discussed in Section 3, above, available groundwater quality data indicate that vinyl chloride is the only chlorinated VOC that may exceed RGs. For this reason, this investigation is particularly focused on defining the extent of groundwater near Building 99 where vinyl chloride concentrations may exceed the RG of 32 µg/L. However, the concentrations of all the chlorinated

VOCs quantified during the investigation will be evaluated with respect to their corresponding RGs.

If the monitoring results indicate that chlorinated VOCs are not present in the groundwater at concentrations exceeding the RGs, and therefore, are not present at concentrations that pose a potential threat for indoor commercial workers, then the Port may propose to eliminate the VOCs in Groundwater Near Building 99 as a RAP site, or to propose an alternative remedy other than the preferred remedy identified in the RAP (in-situ bioremediation with groundwater monitoring).

To date, monitoring of wells around Building 99 has not been performed in a comprehensive manner for the purpose of assessing the presence of chlorinated VOCs in the groundwater or groundwater flow directions. Of the 23 wells screened in the shallow groundwater installed by the Army near Building 99, 20 are believed to still be suitable for sample collection (two wells have been destroyed and one well currently appears to be filled with soil) (Table 2). Each well has been sampled at least once and certain wells have been sampled on as many as ten occasions. However, since many of the wells were installed to assess potential impacts associated with the former USTs located west of the building, many samples were only analyzed for petroleum hydrocarbons and BTEX. The latest groundwater sampling event conducted by the Army where groundwater samples were analyzed for chlorinated VOCs was in July 2003, when samples were collected from two wells located west of Building 99. However, most of the wells were last sampled in 2000.

This work plan proposes to install five new wells in the Building 99 area to be monitored along with select existing wells for the purpose of investigating the occurrence of chlorinated VOCs in groundwater. Following well installation, the new wells and select existing wells will be sampled for four consecutive quarters. These results are expected to provide a comprehensive understanding of groundwater flow direction and the distribution of chlorinated VOC concentrations in the shallow groundwater.

5. PROPOSED NEW GROUNDWATER MONITORING WELLS

Five groundwater monitoring wells will be installed at the approximate locations shown on Figure 5; actual locations will be determined after consideration of access and existing utilities. Four of the wells will be on Port property and one well will be on OBRA property. The three proposed well locations east and west of Building 99 were chosen to define the eastern and western extent of chlorinated VOCs in the groundwater. The locations proposed in the central portion of Building 99 and outside the northeastern corner of the Building 99 were chosen to be near the two previous grab groundwater sample locations with the highest vinyl chloride concentrations. Well installation and soil sampling activities will be conducted by, or under the direct supervision, of professional civil engineers or registered geologists, who will also be responsible for obtaining well installation permits from the Alameda County Public Works Agency.

Based on boring logs prepared by the Army from installation of borings and wells near Building 99, the groundwater table is generally encountered at about five feet bgs in the fill layer. The fill is underlain by a continuous layer of Young Bay Mud, which is encountered at about 15 feet bgs. The existing wells near Building 99 are about 15 feet deep, with screened intervals around 5 to 15 feet bgs.

The boreholes for the new wells will be drilled using hollow-stem augers and continuously sampled during drilling using split-spoon samplers or equivalent. The lithology will be logged in accordance with the Unified Soil Classification System. Two soil samples will be collected from the unsaturated zone from each borehole, at approximately one to two feet bgs and at 3.5 to 4.5 feet bgs; these sample depths were chosen to provide reasonable coverage of the soil column above the water table at roughly evenly-spaced intervals. Soil samples will be collected directly from the intact cores using EnCore™ or other appropriate samplers in accordance with U.S. EPA Method 5035. After filling the EnCore™ samplers, the soil remaining in the liner will be monitored for organic vapors using a organic vapor meter and the readings will be recorded in the boring log. The EnCore™ samplers for each sample will be placed in a single zip lock bag. The soil samples will be analyzed for chlorinated VOCs by EPA Method 8260B.[5] Sample handling procedures after collection will be the same as those described below for groundwater samples.

The proposed new wells will be constructed similarly to the existing wells, except that the casing for the new wells will be two inches in diameter, instead of four inches as are the Army wells. The new wells will be installed through approximately eight-inch diameter hollow-stem augers. The wells will be constructed with pre-cleaned Schedule 40 PVC casing and screen sections which will be threaded; the sections will be screwed together without using solvents or glues. The screen section will consist of 0.01- or 0.02-inch factory-slotted screen and is expected to be about 10 feet in length and be placed between about five to 15 feet bgs. The bottom of the wells will be plugged with threaded end caps. The upper approximately five feet of the wells will consist of blank PVC casing and the top will be fitted with a locking well cap. A continuous filter pack will be placed in the annular space between the casing and the wall of the borehole by pouring commercial grade (e.g., #212 size) sand extending from the bottom of the screen section up to about one foot above the screen section. One to two feet of bentonite pellets will be placed above the filter pack in the annular space which will be hydrated with deionized water. Neat cement grout will be placed from the top of the bentonite layer up to several inches below the ground surface to complete the annular seal. The surface of the well will be protected in a water-tight, flush-mounted, traffic-rated Christy-box or equivalent which will be raised slightly above the surrounding pavement.

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[5] Additional analyses may be performed if other contaminants are suspected to be present based on field observations.

At a minimum of 24 hours after well completion, the wells will be developed to remove sediment that may have entered the casing by pumping and surging. The goal of well development is to provide for groundwater samples with very low turbidity readings for chemical analysis.

The hollow stem augers and all equipment used to construct and develop the wells that may have contacted soil or groundwater will be decontaminated before initial use and between wells by high pressure steam cleaning, or washing with an Alconox solution followed by potable and deionized/distilled water rinses. All decontamination water will be contained in DOT-approved 55-gallon drums and managed with other investigation-derived wastes. Soil cuttings from boreholes for the new wells will also be contained in DOT-approved 55- gallon drums.

6. PROPOSED GROUNDWATER SAMPLING PROGRAM

The proposed groundwater sampling program for the VOCs in Groundwater Near Building 99 RAP site will be performed by a Port-designated consultant for wells on Port property, and by an OBRA-designated consultant for wells on OBRA property. The consultants will follow the procedures described below.

6.1 Survey of New and Existing Wells

All new and existing wells included in the VOC monitoring network will be surveyed by a licensed land surveyor to determine top of casing elevation relative to the NAVD88 datum and horizontal coordinates relative to the NAD83, State Plane, California, Zone 3 system.

6.2 Sample Locations

The proposed monitoring network will consist of the five new wells and seven existing wells (SMW-42, SMW-85, SMW-86, ICFMW204, ICFMW205, ITMW243, and ITMW244) (Figure 5). Well construction information compiled from boring logs and other documentation provided by the Army is summarized in Table 2. Groundwater samples from all of these wells will be collected for four quarters.

Monitoring is not proposed for 16 existing shallow groundwater monitoring wells that the Army installed in the area, 13 of which are presumed to be still functional (Table 2). The 13 wells will not be sampled because chlorinated VOCs have not been identified in groundwater samples collected in the vicinity of the well, and/or the monitoring network includes a nearby well. Figure 5 indicates the range of vinyl chloride concentrations that have been identified in groundwater samples collected from each well that was analyzed for chlorinated VOCs, and the number of groundwater sampling events that has occurred at each well. The rationale for excluding these existing wells is indicated in Table 2.

6.3 Sampling Procedures

Purging and sampling procedures will be consistent with procedures described in the *Final Groundwater Monitoring Plan: USTs 11/12/13 and 11A/12A/13A, Building 991 AST, and Eastern End of Building 807*, Former Oakland Army Base - EDC Area (EKI, 2004).

6.3.1 Water Level Measurements

Prior to sample collection, the depth to groundwater will be measured in all the wells included in the monitoring network in as short a period as possible (e.g, within 30 minutes). Upon opening the well cap, the possible presence of free-phased liquid will be checked with a dual-phase probe. The depth to groundwater from the top of well casing will be measured to an accuracy of 0.01 foot and recorded on field logs. After the groundwater samples have been collected, the total depth of each well will be measured.

The probe will be decontaminated before initial use and between wells. Decontamination will consist of washing the probe and any portion of the tape that may have contacted groundwater in an Alconox or equivalent solution, rinsing with potable water, followed with a final rinse with deionized water. Water will be contained in a DOT-approved 55-gallon drum.

If initial water level data do not clarify groundwater flow direction in the Building 99 area, it may be necessary to conduct a tidal study in select wells in the monitoring network. A work plan will be submitted to DTSC for review and comment if a tidal study is judged to be necessary.

6.3.2 Purging and Sample Collection

Each well will be purged and sampled using a low-flow method that is generally consistent with procedures described in U.S. EPA guidance on low-flow purging and sampling method (U.S. EPA, 1996).

Purging procedures are as follows:

- Purging and sampling will be performed using a peristaltic pump with new or dedicated teflon, teflon-lined polyethylene, and/or silicon tubing (both down-hole tubing and tubing inside the pump rotor housing).

- Pump will be operated at a rate that does not cause the drawdown to be more than 0.3 meter; typical flow rates are anticipated to be on the order of 0.1 to 0.5 liter/minute, but higher rates may be used provided the drawdown does not exceed 0.3 meter.

- Purged water will be monitored for pH, electrical conductivity, temperature, turbidity, and dissolved oxygen.

- Drawdown and water quality parameters will be measured every three to five minutes if the flow rate is between 0.1 to 0.5 liter/minute; frequency shall be increased if the flow rate is higher than 0.5 liter/minute.

- Purging will be considered adequate when, over three consecutive readings, pH is within ±1 unit, conductivity is within ±10 percent, and temperature is within ± 1 degree Celsius.
- Regardless of water quality parameter measurements, wells will not be purged of more than three casing volumes.

Sample collection procedures are as follows:

- After purging is complete, groundwater samples will be collected using the same equipment directly into laboratory-prepared bottles.

- Sampling flow rates will be less than 0.5 liter/minute.

- Intake tube will be placed at approximately the middle of the saturated screened interval.

- Wells will be sampled in the sequence indicated in Table 2, beginning with the wells that are expected to have the lowest VOC concentrations and proceeding to the wells with the highest concentrations.

- A continuous and smooth stream of water will be allowed to run down the insides of the vials to completely fill the bottles. After capping, each vial will be inverted to check for entrapped air. If any bubble is observed, the vial will be discarded and a new vial will be filled.

6.3.3 Sample Analyses

Soil and groundwater samples will be analyzed for chlorinated VOCs, using EPA Method 8260B, by California-certified laboratories to be determined by the Port and OBRA. The laboratory will be instructed to analyze for only the chlorinated VOCs listed in Table 1.

6.3.4 Sample Identification

Groundwater samples will be identified by a unique sample ID number in the following format:

"Well_ID-ddmmyy" where "Well_ID" is the designation of the well (e.g., ICFMW204), and ddmmyy represent the date of sampling (e.g., 151204 for a sample collected on 15 December 2004).

6.3.5 Sample Handling

Each sample bottle to be submitted to the laboratory for analysis will be inspected to ensure that there is no entrapped air, and that it is properly sealed and labeled with the following information:

- Site name
- Sample ID
- Sample time and date
- Name or initial of sample collector(s)
- Name of preservative used (if any)
- Laboratory analysis requested

A chain-of-custody form(s) will be prepared for each day of sampling activity to document sample possession from the time of sample collection to when samples are received by the laboratory. The form will include the information recorded on the sample bottle plus the information below:

- Client name and project number
- Site name
- Matrix of each sample
- Number and type of sample bottles included for each sample
- Name of designated analytical laboratory
- Signature of sampler(s)
- Signature of all persons involved in transporting the samples to the laboratory and time/date of each transfer in possession
- Special requests and remarks, if any

All sample bottles will be placed immediately after sealing and labeling in a cooler containing sufficient ice to maintain the cooler temperature at about 4 degrees Celsius.

6.3.6 Trip Blanks, Equipment Rinsate Blank, and Duplicates

One trip blank prepared by the laboratory will be stored with the samples and resubmitted to the laboratory for analysis on each day of sampling. One duplicate sample will be collected from one well during each monitoring event. The duplicate sample will be collected immediately after the initial sample using the same equipment; the duplicate sample will be given a unique sample ID. Equipment rinsate blanks are not proposed because new tubing will be used for each sample location, and therefore, decontamination of sampling equipment will not be performed.

6.4 Documentation of Sampling Procedures

The consultants conducting each sampling event will submit documentation of the sampling activities to the Port and OBRA within two weeks of sampling. Documentation will include:

- Daily activity log
- Instrument calibration log for each day
- Water level measurements from initial water level gauging
- Groundwater sampling form for each well sampled with well-specific purging and sampling information (e.g., sampling equipment, purge rate, drawdown, water quality parameters, intake tube placement, duplicate samples, etc.)
- Chain-of-custody forms

6.5 Quality Control/Quality Assurance

Sampling activities will be performed in conformance with the quality control/quality assurance protocols specified in the Draft Sitewide Quality Assurance Program Plan for the Former Oakland Army Base - EDC Area (Veridian, 2005). This document will remain in draft form until approved by DTSC. Laboratory results will be presented with Level II reporting requirements.

6.6 Management of Investigation Derived Wastewater

All decontamination water, purged groundwater, and soil cuttings will be stored in DOT-approved drums, which will be clearly labeled to indicate source. The drums will be stored at a secured location to be determined by the Port and OBRA. Samples of the soil and groundwater will be collected as necessary to classify the waste and to satisfy profiling requirements. After receipt of analytical results, OBRA and the Port will arrange to properly dispose of its soil and water drums in accordance with applicable regulations.

7. DATA MANAGEMENT

Chemical data collected during this proposed investigation will be added to the base-wide database maintained by OBRA. Electronic data deliverable ("EDD") files provided by the analytical laboratories will be loaded into the existing database using standardized protocols.

8. SITE SPECIFIC HEALTH AND SAFETY PLAN

The consultants performing the well installation and groundwater monitoring activities will prepare their own health and safety plan ("HSP") to protect sampling personnel from potential exposure to chemicals of concern that may be encountered during sampling. The HSP must be developed under the direction of a Certified Industrial Hygienist and comply with the California Occupational Safety and Health Agency standards for the anticipated activities. The HSP should take into consider available groundwater quality data and up-to-date toxicological data. The HSP will be submitted to DTSC at least two weeks prior to the beginning of field activities.

9. DATA SUBMITTAL TO DTSC

Documentation of well installation, including drilling logs, well construction information, and well development logs, and documentation of the initial sampling event will be provided to DTSC about six weeks after sampling activities. The Port's and/or OBRA's consultants who conduct the subsequent quarterly monitoring activities would provide information documenting the sampling event and analytical results to the Port within four weeks of each monitoring event. The Port would then transmit the documentation to DTSC within approximately six weeks after sampling activities. The information to be submitted to DTSC would include:

- Narrative description of sampling procedures and equipment used, including description of deviation in sampling procedures from those specified in this work plan (if any);
- Groundwater sampling forms for each well documenting well-specific details, including water level measurements and values of water quality parameters measured during purging;
- Summary table of water level measurements with depth to water and groundwater elevations;
- Chain-of-custody forms documenting proper handling of the samples from the field to the laboratory; and
- Hard copy of laboratory reports.

Data collected during the proposed monitoring activities will be evaluated at the completion of the investigation. A report presenting a comprehensive evaluation of the chlorinated VOC groundwater data will be prepared by the Port and submitted to DTSC for review and comment. This report may be in the form of a Remedial Design and Implementation Plan.

10. SCHEDULE

The proposed schedule for the focused VOC in groundwater investigation is described in terms of the date that DTSC approves this proposed work plan, which is anticipated to be in 1 March 2005. Once the plan has been approved, the new wells will be installed within about three weeks (by end of Week 3), and well development and the first quarterly sampling will be conducted within the following week (by end of Week 4). The first data submittal to DTSC is expected to be by the end of Week 10, or anticipated to be in May 2005.

For the three subsequent quarterly sampling events, they would be scheduled at approximately 3-month intervals, with the fourth quarterly and final event likely to be conducted in December 2005. Data would be submitted to DTSC about six weeks following sampling. A comprehensive report presenting an evaluation of the data will be prepared about three months following the last data submittal, which would be in May 2006.

11. REFERENCES

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Attachments:

Tables

1. Summary of Chlorinated VOCs in Groundwater
2. List of Groundwater Monitoring Wells

Figures

1. Regional Location
2. Maximum Vinyl Chloride Concentrations in Groundwater
3. Maximum Cis-1,2-Dichloroethene Concentrations in Groundwater
4. Soil Sample Locations Analyzed for Chlorinated VOCs
5. Proposed VOC Groundwater Monitoring Network

TABLE 1: **Summary of Chlorinated VOCs in Groundwater**

VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base (μg/L)

Location ID	Sample Date	Sample ID	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2,3-TRICHLOROPROPANE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	DIBROMOCHLOROMETHANE	METHYLENE CHLORIDE	TETRACHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE	TRICHLOROFLUOROMETHAN	VINYL CHLORIDE
		Remediation Goal	1,900	2,800	6,700	33,000	100	1,900	110	850	72	2,500	180,000	2,100	19,000	960	190,000	2,800	2,800,000	32
Grab Groundwater Samples from Borings/Hydropunches																				
10S42	12/21/1999	10S42-WG-1623	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**6.2**	<0.5	<5.0	**0.9**	<0.5	<0.5	<0.5	**17.7**
10S43	12/21/1999	10S43-WG-1622	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**8.3**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**4.7**
10S44	12/21/1999	10S44-WG-1624	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5.4**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**19.3**
10S48	12/21/1999	10S48-WG-1626	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.8**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
10S49	1/18/2000	10S49-WG-1746	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**29**
10S49	1/18/2000	10S49-WG-1747	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**4.8**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**25.9**
10S50	1/18/2000	10S50-WG-1748	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**4.2**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**16.6**
10S51	1/18/2000	10S51-WG-1749	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**16.2**	<0.5	<5.0	<0.5	**1.4**	<0.5	<0.5	**7.6**
10S52	1/18/2000	10S52-WG-1750	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**12**	<0.5	<5.0	<0.5	**0.9**	<0.5	<0.5	**3.8**
10S53	1/18/2000	10S53-WG-1751	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**7.4**	<0.5	<5.0	<0.5	**0.4** J	<0.5	<0.5	**3.5**
10S54	1/18/2000	10S54-WG-1752	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
10S55	1/18/2000	10S55-WG-1753	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**13.5**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**24.2**
10S56	1/18/2000	10S56-WG-1754	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5.8**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**15.3**
10S57	2/18/2000	10S57-WG-2306	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**2.7**	<0.5	**0.9** J	<0.5	<0.5	<0.5	<0.5	**2.6**
10S58	2/18/2000	10S58-WG-2301	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**1.3**	<0.5	**0.7** J	<0.5	<0.5	<0.5	<0.5	**9.6**
10S58	2/18/2000	10S58-WG-2302	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**1.2**	<0.5	**0.9** J	<0.5	<0.5	<0.5	<0.5	**9.3**
10S59	2/18/2000	10S59-WG-2304	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**3.8**	<0.5	**1** J	<0.5	<0.5	<0.5	<0.5	**1.6**
10S60	2/18/2000	10S60-WG-2305	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**1.6**	<0.5	**1** J	<0.5	<0.5	<0.5	<0.5	<0.5
10S61	2/18/2000	10S61-WG-2307	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**17.1**	<0.5	**1** J	<0.5	**1.5**	<0.5	<0.5	**2.4**
10S62	2/18/2000	10S62-WG-2308	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	**11.3**	<0.5	**1** J	<0.5	**1.7**	<0.5	<0.5	**1.5**
10S63	2/18/2000	10S63-WG-2309	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1** J	<0.5	<0.5	<0.5	<0.5	<0.5
10S64	2/18/2000	10S64-WG-2310	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8** J	<0.5	<0.5	<0.5	<0.5	<0.5
10S65	2/18/2000	10S65-WG-2311	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1** J	<0.5	<0.5	<0.5	<0.5	<0.5
10S66	2/24/2000	10S66-WG-2351	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**8.9**
10S67	2/24/2000	10S67-WG-2352	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**41.1**	<0.5	<5.0	<0.5	**6.9**	<0.5	<0.5	**4.2**
10S68	2/24/2000	10S68-WG-2353	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**9.5**	<0.5	<5.0	<0.5	**6.7**	<0.5	<0.5	**13.1**
ICF10S1	10/7/1998	ICF10S1-WG-0943	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S1	10/7/1998	ICF10S1-WG-0944	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 1: **Summary of Chlorinated VOCs in Groundwater**
VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base (μg/L)

Location ID	Sample Date	Sample ID	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2,3-TRICHLOROPROPANE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	DIBROMOCHLOROMETHANE	METHYLENE CHLORIDE	TETRACHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE	TRICHLOROFLUOROMETHAN	VINYL CHLORIDE
		Remediation Goal	1,900	2,800	6,700	33,000	100	1,900	110	850	72	2,500	180,000	2,100	19,000	960	190,000	2,800	2,800,000	32
ICF10S2	10/7/1998	ICF10S2-WG-0934	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.05** J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S6	10/7/1998	ICF10S6-WG-0928	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S7	10/7/1998	ICF10S7-WG-0930	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S8	10/7/1998	ICF10S8-WG-0932	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.91**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.08** J
ICF10S9	10/14/1998	ICF10S9-WG-1011	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S10	10/28/1998	ICF10S10-WG-0713	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S12	11/2/1998	ICF10S12-WG-0778	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S14	10/29/1998	ICF10S14-WG-0727	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.99**	<0.5	<0.5	<0.5	**0.3** J	<0.5	<0.5	**1.97**
ICF10S15	10/29/1998	ICF10S15-WG-0730	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**5.24**	<0.5	<0.5	<0.5	**0.08** J	<0.5	<0.5	**1.03**
ICF10S20	10/28/1998	ICF10S20-WG-0706	<0.5	<0.5	<0.5	<0.5	<0.5	**0.14** J	<0.5	<0.5	<0.5	<0.5	**5.7**	<0.5	<0.5	<0.5	**0.08** J	<0.5	<0.5	**1.18**
ICF10S21	10/28/1998	ICF10S21-WG-0701	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
ICF10S21A	2/3/1999	ICF10S21A-WG-1109	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S22	2/3/1999	ICF10S22-WG-1107	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S23	2/3/1999	ICF10S23-WG-1104	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S24	2/3/1999	ICF10S24-WG-1100	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	**1.8**	<0.5	**18.8**	<0.5	**0.6**	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S25	2/3/1999	ICF10S25-WG-1097	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S26	2/3/1999	ICF10S26-WG-1092	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S26	2/3/1999	ICF10S26-WG-1093	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S27	2/2/1999	ICF10S27-WG-1085	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S28	2/2/1999	ICF10S28-WG-1088	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICF10S29	2/8/1999	ICF10S29-WG-1141	<2.5	<2.5	<2.5	<2.5	--	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<25	<2.5	<2.5	<2.5	<2.5	<2.5
ICF10S32	10/28/1998	ICF10S32-WG-0704	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
IT10S100A	4/24/2002	IT10S100-WG-3761	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5** J	<1	<0.5	<0.5	<1	<0.5
IT10S101	4/30/2002	IT10S101-WG-3777	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**13.3**	<0.5	<5	<1	**1.1**	<0.5	<1	**0.6**
IT10S102	4/16/2002	IT10S102-WG-3558	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**8.3**	<0.5	<5	**0.7** J	<0.5	<0.5	<1	**13.8**
IT10S103	4/16/2002	IT10S103-WG-3559	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**2**	<0.5	**0.5** J	<1	<0.5	<0.5	<1	<0.5
IT10S104	4/16/2002	IT10S104-WG-3561	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	<0.5	<0.5	<1	<0.5
IT10S104	4/16/2002	IT10S104-WG-3562	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<1	<0.5	<0.5	<1	<0.5
IT10S105	4/16/2002	IT10S105-WG-3560	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.3** J	<1	<0.5	<0.5	<1	<0.5

TABLE 1: **Summary of Chlorinated VOCs in Groundwater**

VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base (μg/L)

Location ID	Sample Date	Sample ID	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2,3-TRICHLOROPROPANE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	DIBROMOCHLOROMETHANE	METHYLENE CHLORIDE	TETRACHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE	TRICHLOROFLUOROMETHAN	VINYL CHLORIDE
		Remediation Goal	1,900	2,800	6,700	33,000	100	1,900	110	850	72	2,500	180,000	2,100	19,000	960	190,000	2,800	2,800,000	32
IT10S106	4/30/2002	IT10S106-WG-3775	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**1.1**	<0.5	<5	<1	<0.5	<0.5	<1	<0.5
IT10S106	4/30/2002	IT10S106-WG-3776	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**1.2**	<0.5	<5	<1	<0.5	<0.5	<1	<0.5
K10S101	7/1/1997	10SP101W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S101	7/1/1997	10SP101W2	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S101	7/1/1997	10SP110W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S102	7/1/1997	10SP102W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S103	7/1/1997	10SP103W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S104	7/1/1997	10SP104W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S105	7/1/1997	10SP105W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
K10S106	7/1/1997	10SP106W1	<1	<1	<1	<1	<1	<1	--	<1	<1	<1	<1	<1	<10	<1	<1	<1	<1	<10
OBSB07	4/3/2002	OBSB07-WG-5.0-10	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	--	**0.9**
Groundwater Monitoring Wells																				
ICFMW203	1/27/2000	MW203-WG-2221	<0.5	<0.5	<0.5	<0.5	<1.1	<0.89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1** J	<0.5	<0.5	<0.5	<0.5	<0.5
ICFMW203	4/12/2000	ICFMW203-WG-2363	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0
ICFMW204	1/27/2000	MW204-WG-2222	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICFMW204	1/27/2000	MW204-WG-2223	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICFMW204	4/12/2000	ICFMW204-WG-2362	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.3**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**1.8**
ICFMW205	1/27/2000	MW205-WG-2224	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICFMW205	4/12/2000	ICFMW205-WG-2361	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
ICFMW207	7/23/2003	ICFMW207-7/23/2003-1552	<0.3	<0.3	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5	<0.3	<3	<0.5	<0.5	<0.3	<0.5	<0.3
ITMW243	5/3/2002	ITMW243-WG-3798	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**0.39** J	<0.5	<5	<1	<0.5	<0.5	<1	<0.5
ITMW244	5/2/2002	ITMW244-WG-3796	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**17**	<0.5	**0.8** J	<1	<0.5	<0.5	<1	**3.8**
ITMW244	5/2/2002	ITMW244-WG-3797	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	**18.2**	<0.5	**0.8** J	<1	<0.5	<0.5	<1	**4**
SMW-42	10/6/1998	SMW42-WG-0230	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SMW-42	1/7/1999	SMW42-WG-0256	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-42	4/27/1999	SMW42-WG-1226	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-42	7/26/1999	SMW42-WG-1270	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 1: **Summary of Chlorinated VOCs in Groundwater**

VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base (μg/L)

Location ID	Sample Date	Sample ID	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2,3-TRICHLOROPROPANE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	DIBROMOCHLOROMETHANE	METHYLENE CHLORIDE	TETRACHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE	TRICHLOROFLUOROMETHAN	VINYL CHLORIDE
		Remediation Goal	1,900	2,800	6,700	33,000	100	1,900	110	850	72	2,500	180,000	2,100	19,000	960	190,000	2,800	2,800,000	32
SMW-42	10/26/1999	SMW42-WG-1327	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-42	1/27/2000	SMW42-WG-2234	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.4** J	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-42	7/23/2003	SMW-42-7/23/2003-1525	<0.3	<0.3	<0.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5	<0.3	<3	<0.5	<0.5	<0.3	<0.5	<0.3
SMW-45	4/12/2000	SMW45-WG-2360	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-76	1/7/1999	SMW76-WG-0255	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5**	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-76	4/27/1999	SMW76-WG-1225	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-76	7/26/1999	SMW76-WG-1268	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-76	10/26/1999	SMW76-WG-1318	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2** J	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-76	1/28/2000	SMW76-WG-2235	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.5** J	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	10/6/1998	SMW83-WG-0229	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.07** J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	1/7/1999	SMW83-WG-0250	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	4/27/1999	SMW83-WG-1227	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	7/26/1999	SMW83-WG-1271	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	10/26/1999	SMW83-WG-1319	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.4** J	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-83	1/27/2000	SMW83-WG-2226	<0.5	<0.5	<0.5	<0.5	<1.1	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-85	10/6/1998	SMW85-WG-0228	<0.5	<0.5	<0.5	<0.5	<0.5	**0.27** J	<0.5	<0.5	<0.5	<0.5	**2.45**	<0.5	<0.5	<0.5	**0.13** J	<0.5	<0.5	**1.11**
SMW-85	1/6/1999	SMW85-WG-0242	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	**1.9**	<0.5	**0.6** J	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-85	4/27/1999	SMW85-WG-1224	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.6**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**0.6**
SMW-85	7/27/1999	SMW85-WG-1274	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.9**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**1.8**
SMW-85	10/26/1999	SMW85-WG-1317	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.7**	<0.5	**0.5** J	<0.5	<0.5	<0.5	<0.5	**1.5**
SMW-85	1/28/2000	SMW85-WG-2236	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.7**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-86	10/6/1998	SMW86-WG-0226	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.28**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**19.2**
SMW-86	10/6/1998	SMW86-WG-0227	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.28**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**18.3**
SMW-86	1/6/1999	SMW86-WG-0245	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	**1.1**	<0.5	**0.5** J	<0.5	<0.5	<0.5	<0.5	**17.2**
SMW-86	1/6/1999	SMW86-WG-0246	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5
SMW-86	4/27/1999	SMW86-WG-1222	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**20.4**
SMW-86	4/27/1999	SMW86-WG-1223	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**24.5**
SMW-86	7/26/1999	SMW86-WG-1272	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**19.7**

TABLE 1: **Summary of Chlorinated VOCs in Groundwater**
VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base (μg/L)

Location ID	Sample Date	Sample ID	1,1,2,2-TETRACHLOROETHANE	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2,3-TRICHLOROPROPANE	1,2-DICHLOROETHANE	1,2-DICHLOROPROPANE	BROMODICHLOROMETHANE	CARBON TETRACHLORIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	DIBROMOCHLOROMETHANE	METHYLENE CHLORIDE	TETRACHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE	TRICHLOROFLUOROMETHAN	VINYL CHLORIDE
		Remediation Goal	1,900	2,800	6,700	33,000	100	1,900	110	850	72	2,500	180,000	2,100	19,000	960	190,000	2,800	2,800,000	32
SMW-86	7/26/1999	SMW86-WG-1273	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.8**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**22.2**
SMW-86	10/26/1999	SMW86-WG-1315	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**18.7**
SMW-86	10/26/1999	SMW86-WG-1316	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**21.6**
SMW-86	1/28/2000	SMW86-WG-2237	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**18.1**
SMW-86	1/28/2000	SMW86-WG-2238	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**14.4**
SMW-86	4/12/2000	SMW86-WG-2364	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**20.2**
SMW-86	4/12/2000	SMW86-WG-2365	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1**	<0.5	<5.0	<0.5	<0.5	<0.5	<0.5	**18.1**

Notes: This table summarizes only those chlorinated volatile organic compounds for which Remediation Goals have been established in the Final Remedial Action Plan.
VOCs = volatile organic compound.
Values shown in bold are concentrations quantified above laboratory reporting limits, unless otherwise specified.
Values shown with a "J" suffix are estimated values, reported by the laboratory as "trace".
Sample locations are shown in Figures 2 and 3.

TABLE 2: **List of Groundwater Monitoring Wells**
VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base

Well ID	Total Depth casing (feet bgs)	Screen Interval. (feet bgs)	Slot Size (inch)	Sand Pack Interval. (feet bgs)	Casing Diameter (inch)	Material	Comments
Wells Proposed for Quarterly Monitoring							**Order of Initial Sample Collection**
B99MW01	~15	~5-15	0.01	~4-15	2	PVC	To be sampled - twelfth
B99MW02	~15	~5-15	0.01	~4-15	2	PVC	To be sampled - seventh
B99MW03	~15	~5-15	0.01	~4-15	2	PVC	To be sampled - eleventh
B99MW04	~15	~5-15	0.01	~4-15	2	PVC	To be sampled - fourth
B99MW05	~15	~5-15	0.01	~4-15	2	PVC	To be sampled - ninth
ICFMW204	15	5-15	0.01	3-15	4	PVC	To be sampled - fifth
ICFMW205	15	5-15	0.01	3-15	4	PVC	To be sampled - second
ITMW243	15	5-15	unknown	4-15	4	PVC	To be sampled - third
ITMW244	15	5-15	unknown	4-15	4	PVC	To be sampled - eighth
SMW-42	14	4-14	0.02	3.5-14	4	PVC	To be sampled - first
SMW-85	16.5	4-16.5	0.01	3-17	4	PVC	To be sampled - sixth
SMW-86	16.5	4-16.5	0.01	3-17	4	PVC	To be sampled - tenth
Wells Not Proposed for Monitoring							**Reason for Not Sampling**
ICFMW203	15	5-15	0.01	3-15	4	PVC	Located between wells ICFMW204, ICFMW205, SMW-86, which will be monitored. VC was reported as <0.5 and <5 μg/L during two previous monitoring events (last sampled 4/00).
ICFMW206	15	5-15	0.01	3-15	4	PVC	Destroyed.
ICFMW207	15	5-15	0.01	3-15	4	PVC	VC not expected to be present in this area. VC was reported as <0.3 μg/L during one previous monitoring event (last sampled 7/03).
ICFMW214	13	3-13	0.01	3-13	4	PVC	VC not suspected to be present in this area. VC has never been analyzed in a groundwater sample collected from this well.
SMW-39	14	4-14	0.02	3.5-14	4	PVC	Destroyed.
SMW-41	14	4-14	0.02	3.5-14	4	PVC	VC not suspected to be present in this area. VC has never been analyzed in a groundwater sample collected from this well.
SMW-43	14	4-14	0.02	3.5-14	4	PVC	Located near well ICFMW205, which will be monitored. VC has never been analyzed in a groundwater sample collected from this well.
SMW-44	13.5	3.5-13.5	0.02	3.5-13.5	4	PVC	Located near well ICFMW205, which will be monitored. VC has never been analyzed in a groundwater sample collected from this well.
SMW-45	14	4-14	0.02	3.5-14	4	PVC	Located near well ICFMW205, which will be monitored. VC was reported as <0.5 μg/L during one previous monitoring event (last sampled 4/00).
SMW-76	16	4-16	0.01	2.5-16.5	4	PVC	VC not expected to be present in this area. VC was reported as <0.5 μg/L during five previous monitoring events (last sampled 1/00).
SMW-79	16	4-16	0.01	3-16.5	4	PVC	VC not suspected to be present in this area. VC has never been analyzed in a groundwater sample collected from this well.
SMW-80	16	4-16	0.01	3-17	4	PVC	Filled with dirt. To be destroyed.

TABLE 2: **List of Groundwater Monitoring Wells**

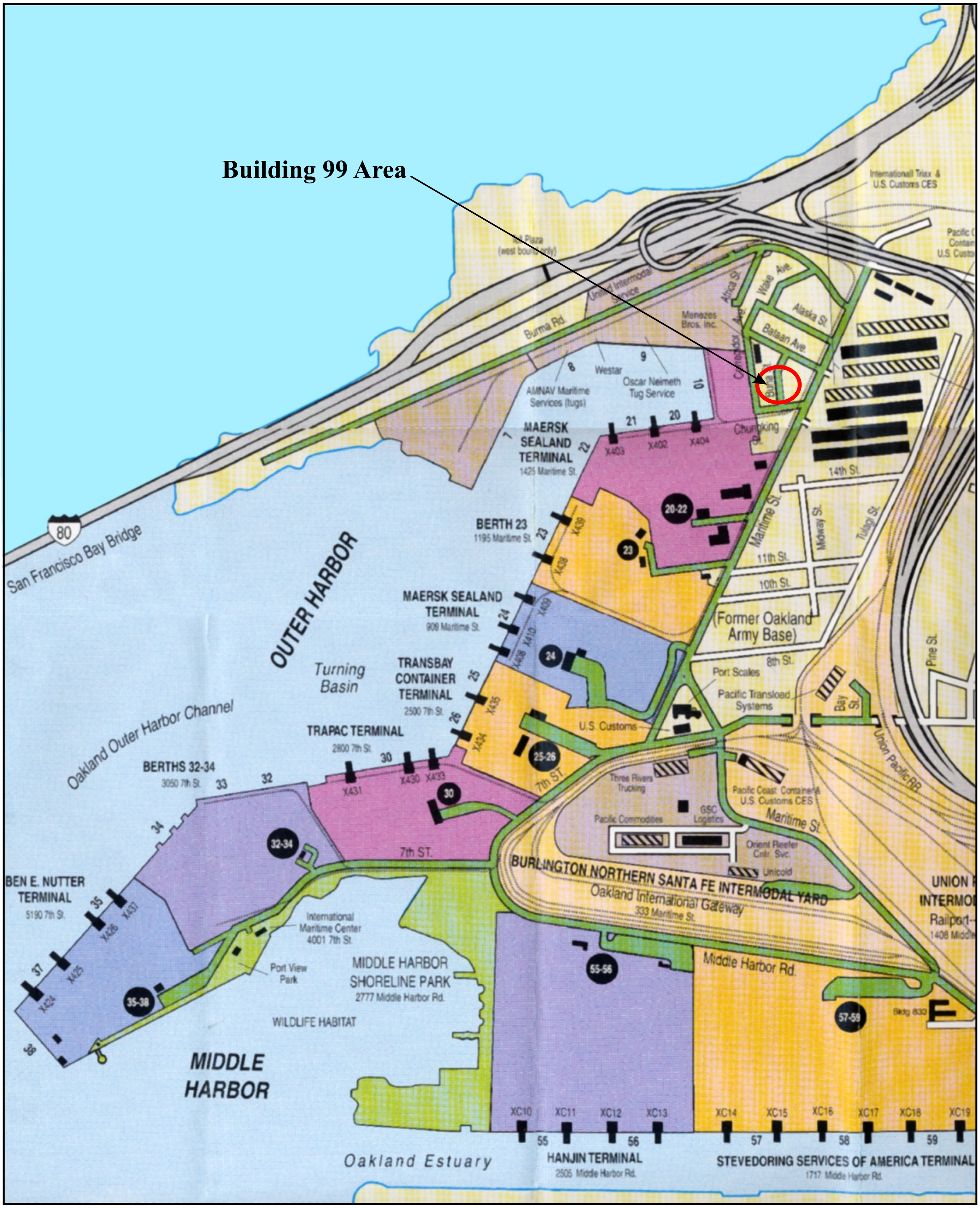
VOCs in Groundwater Near Building 99 RAP Site, Oakland Army Base

Well ID	Total Depth casing (feet bgs)	Screen Interval. (feet bgs)	Slot Size (inch)	Sand Pack Interval. (feet bgs)	Casing Diameter (inch)	Material	Comments
SMW-81	15.5	4-15.5	0.01	3-17	4	PVC	VC not expected to be present in this area. VC has never been analyzed in a groundwater sample collected from this well.
SMW-83	16.5	4-16.5	0.01	3-17	4	PVC	VC not suspected to be present in this area. VC was reported as <0.5 μg/L during six previous monitoring events (last sampled 1/00).
SMW-84	16	4-16	0.01	3-17	4	PVC	VC not exspected to be present in this area. Located near ICFMW203 and ICFMW204, which will be monitored. VC has never been analyzed in a groundwater sample collected from this well.
SMW-87	16.5	4-16.5	0.01	3-17	4	PVC	Located near well ICFMW205, which will be monitored. VC has never been analyzed in a groundwater sample collected from this well.

Notes: bgs = below ground surface
PVC = polyvinyl chloride
VC = vinyl chloride
See Figure 5 for well locations

REGIONAL LOCATION

Figure 1

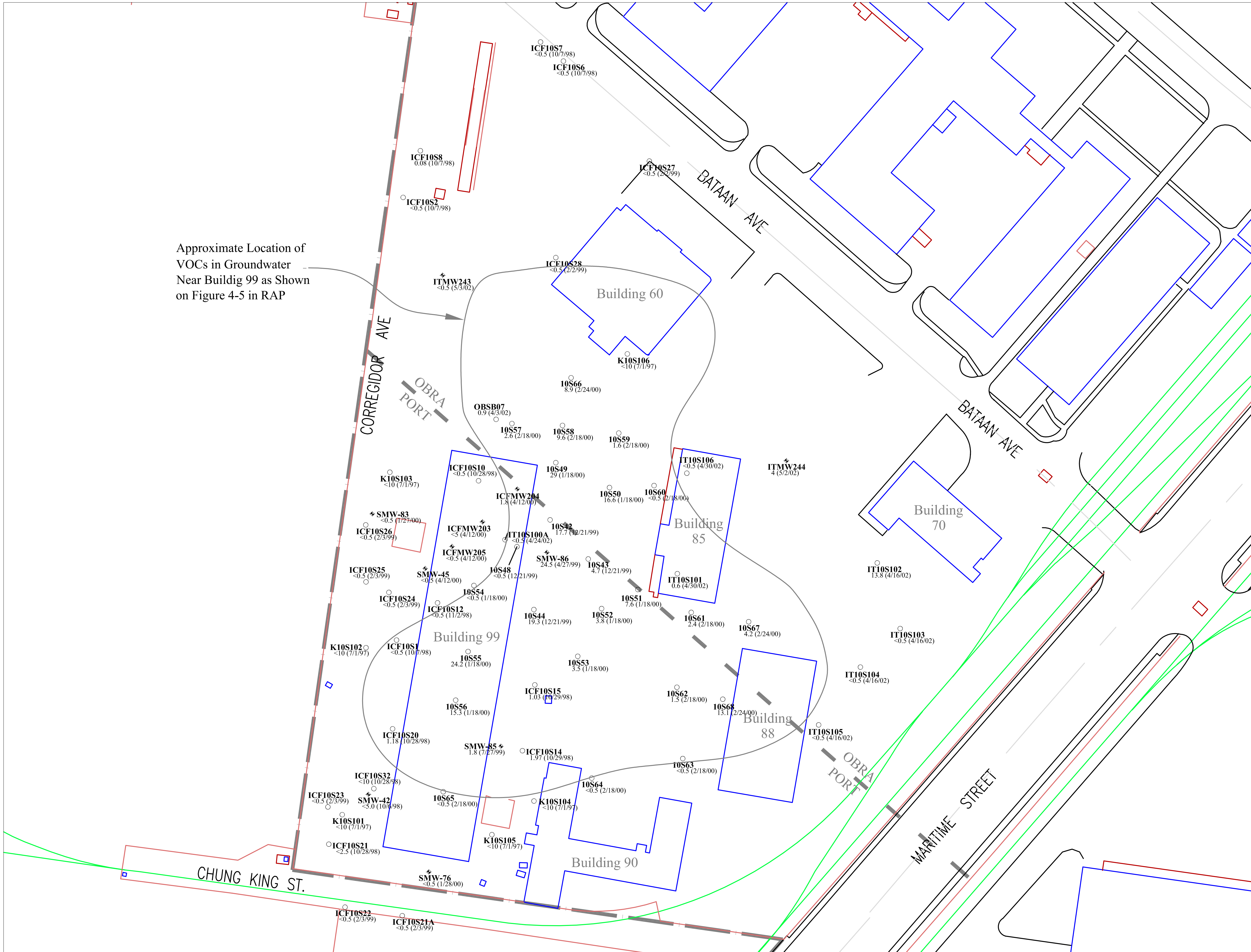


0 1200 Feet

VOC in Groundwater Near Building 99 RAP Site
Former Oakland Army Base
Oakland, California

BASELINE

Y1338-03.A2.00035.fnl.Fig1 RL.cdr - 3/17/05



Legend

- Soil boring or hydropunch where grab groundwater sample was collected and analyzed for vinyl chloride
- Groundwater monitoring well where groundwater sample was collected and analyzed for vinyl chloride

ITMW244
4 (5/2/02)

- Location ID
- Date on which sample was collected
- Maximum vinyl chloride concentration detected at this location (μg/L)
- Boundary between OBRA and Port properties
- EDC property boundary

Notes: See Table 1 for tabulation of all vinyl chloride results.

Remediation goal for vinyl chloride is 32 μg/L.

<0.5 = Not identified above laboratory reporting limit of 0.5 μg/L.

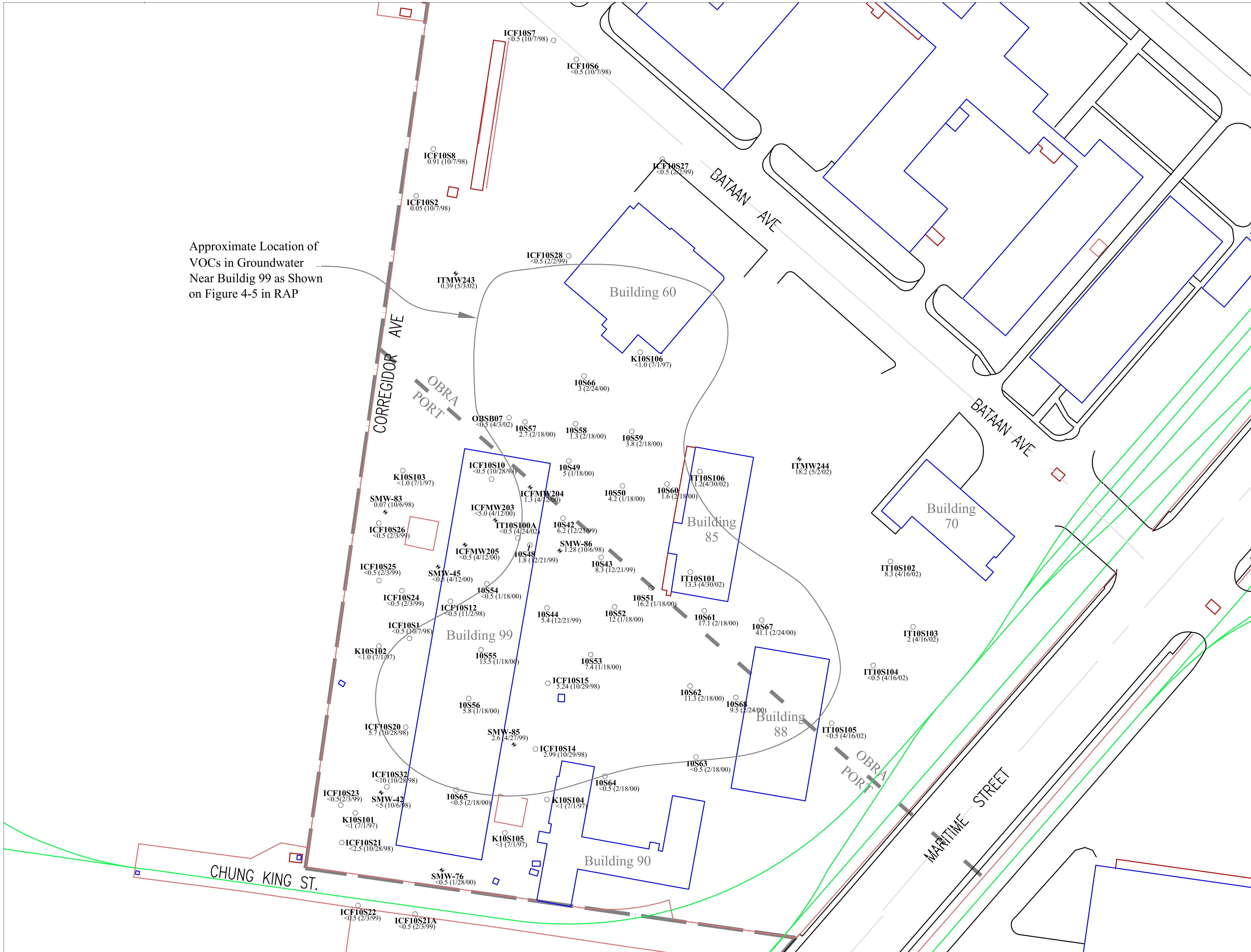
BASELINE

Figure 2
MAXIMUM VINYL CHLORIDE CONCENTRATIONS IN GROUNDWATER

VOCs in Groundwater Near Building 99 RAP Site Former Oakland Army Base Oakland, California

0 100 Feet

Y1338-03.A2.00035.fnl.fig2-5.dwg.Fig2VC - 3/17/05



Legend

- ○ Soil boring or hydropunch where grab groundwater sample was collected and analyzed for cis-1,2-dichloroethene
- Groundwater monitoring well where groundwater sample was collected and analyzed for cis-1,2-dichloroethene

10S62 — Location ID
11.3 (2/18/00)
- Date on which sample was collected
- Maximum cis-1,2-dichloroethene concentration detected at this location (μg/L)

Boundary between OBRA and Port properties

EDC property boundary

Notes: See Table 1 for tabulation of all cis-1,2-dichloroethene results.

Remediation Goal for cis-1,2-dichloroethene is 180,000 μg/L.

<0.5 = Not identified above laboratory reporting limit of 0.5 μg/L.

BASELINE

Figure 3
MAXIMUM CIS-1,2-DICHLOROETHENE CONCENTRATIONS IN GROUNDWATER
VOCs in Groundwater Near Building 99 RAP Site
Former Oakland Army Base
Oakland, California

0 100 Feet

Y1338-03.A2.00035.fnl.fig2-5.dwg.Fig3DCE - 3/17/05

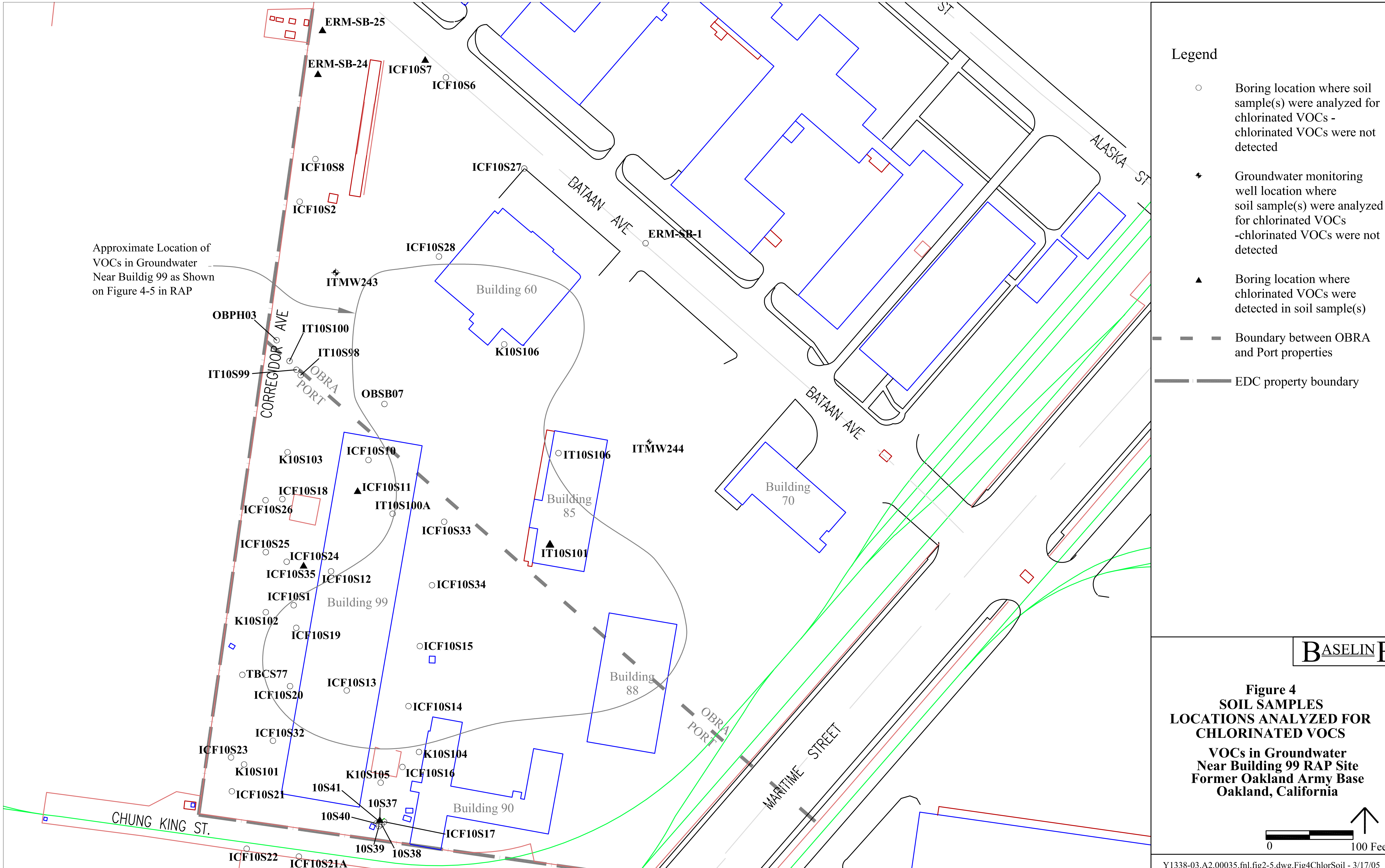
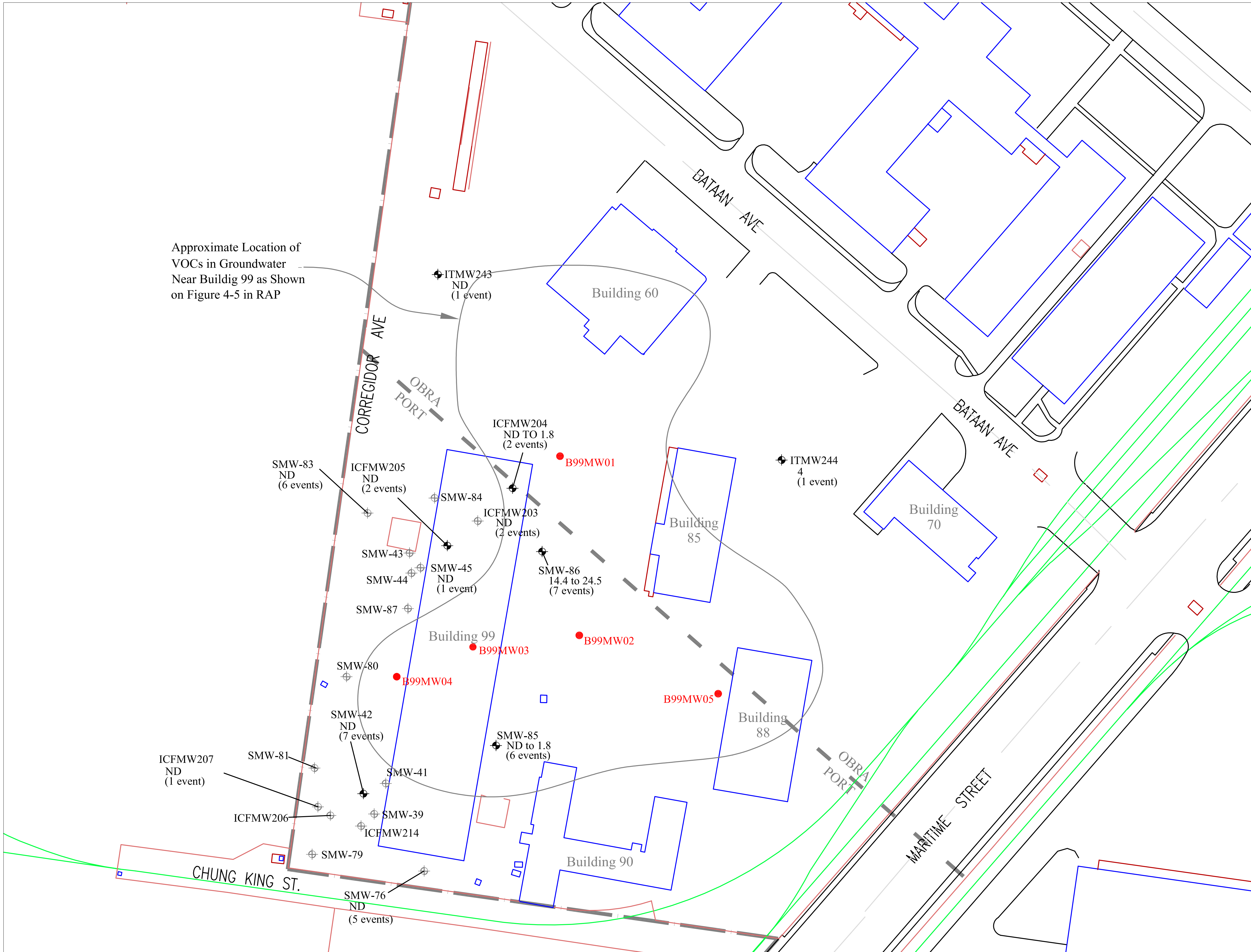


Figure 4
SOIL SAMPLES LOCATIONS ANALYZED FOR CHLORINATED VOCS
VOCs in Groundwater Near Building 99 RAP Site
Former Oakland Army Base
Oakland, California

Y1338-03.A2.00035.fnl.fig2-5.dwg.Fig4ChlorSoil - 3/17/05



Legend

- Well included in proposed VOC groundwater monitoring network
- Well not included in proposed monitoring network
- Proposed new well to be included in proposed VOC groundwater monitoring network

SMW-86 — Well ID
14.4 to 24.5
(7 events) — Range of vinyl chloride concentrations quantified in μg/L over seven sampling events

- Boundary between OBRA and Port properties
- EDC property boundary

Notes: See Table 1 for tabulation of all vinyl chloride results.

ND = Not identified above laboratory reporting limits.

BASELINE

Figure 5
PROPOSED VOC GROUNDWATER MONITORING NETWORK
VOCs in Groundwater Near Building 99 RAP SITE
Former Oakland Army Base
Oakland, California

0 100 Feet

Y1338-03.A2.00035.fnl.fig2-5.dwg.Fig5Wells - 3/17/05